

# Ring Design

## Rotational Capacity

The maximum recommended RPM for all standard external Spirolox Retaining Rings are listed in the ring tables of this manual.

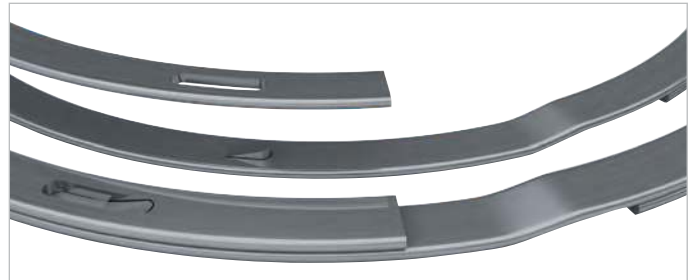
A Spirolox Retaining Ring, operating on a rotating shaft, can be limited by centrifugal forces. Failure may occur when these centrifugal forces are great enough to lift the ring from the groove. The formula below calculates the RPM at which the force holding the ring tight on the groove (cling) becomes zero.

Rapid acceleration of the assembly may cause failure of the retaining ring. If this is a potential problem, contact TFC engineering team for design assistance.

## Self-Locking

This feature allows the ring to function properly at speeds that exceed the recommended rotational capacity. The self-locking option can be incorporated for both external and internal rings.

The self-locking feature utilizes a small tab on the inside turn "locking" into a slot on the outside turn. Self-locking allows the ring to operate at high speeds, withstand vibration, function under rapid acceleration and absorb a degree of impact loading.



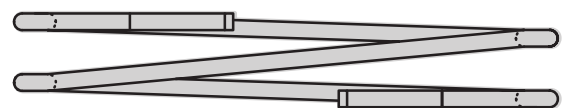
## Balanced

Smalley's balanced feature statically balances the retaining ring. A series of slots, opposite the gap end, account for the missing material in the gap. This characteristic is very useful when the balance of the assembly is critical and it is necessary to reduce eccentric loading.

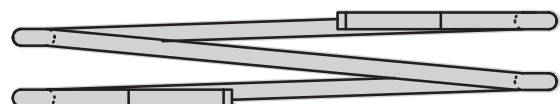


## Left Hand Wound

Smalley retaining rings are wound standard in a clockwise direction. In special applications it is sometimes favorable to have the retaining ring reverse, left hand wound.



**RIGHT HAND  
(STANDARD WOUND)**



**LEFT HAND  
(REVERSE WOUND)**

# Ring Design

## Maximum Allowable RPM for Spirolox Retaining Rings – Metric

Part No.	XVSM	XES	XDNS	XFS	Part No.	XVSM	XES	XDNS	XFS	Part No.	XVSM	XES	XDNS	XFS	Part No.	XVSM	XES	XDNS	XFS
6	51561	-	-	-	35	7004	7485	7628	11685	71	-	2309	-	-	170	945	749	715	1151
7	39742	-	-	-	36	6641	6903	8474	11640	72	3218	2321	2805	3947	175	894	697	671	1088
8	40518	-	-	-	37	-	7227	-	-	75	2949	2152	2537	3648	180	848	657	636	1030
9	35627	-	-	-	38	5994	7174	7556	10520	77	-	-	2379	3467	185	898	631	601	1115
10	31833	-	-	-	40	7573	6172	7181	10841	78	3158	2007	2304	3731	190	854	591	577	860
11	25202	-	-	-	42	6888	5715	6546	8972	80	3025	1981	2576	3747	195	813	569	551	880
12	30875	22153	-	-	45	6021	5158	5740	7861	82	2900	1895	2425	3574	200	775	534	518	837
13	26805	20094	22915	31185	46	-	4909	5505	7006	85	2703	1825	2333	3476	205	495	1068	22915	31185
14	22359	18471	19967	21602	47	-	5570	5283	7232	88	2526	1737	2143	3252	210	802	579	466	1077
15	19625	14543	17836	24273	48	5309	5744	5075	7881	90	2443	1721	2029	2731	220	734	530	425	932
16	17364	14149	18132	29110	50	4901	4084	5651	7885	92	-	-	-	-	230	674	482	527	854
17	14958	15923	15677	19841	52	6057	3616	5251	7318	95	2174	1509	1777	2598	240	622	444	486	735
18	13439	12233	16195	22605	53	-	3450	-	-	98	-	-	1659	2377	250	575	413	451	726
19	12140	11685	14221	20417	54	-	3295	4842	6811	100	1955	1508	1579	2542	260	582	381	424	743
20	11066	10810	12948	18532	55	5380	3360	4680	6576	102	1530	2746	12948	18532	270	541	354	390	718
21	15326	9641	12475	16896	56	5238	3215	4525	6354	105	2082	1399	1435	2640	280	505	328	363	714
22	13341	10397	11421	13523	58	4890	3111	4359	5942	108	1368	2418	11421	13523	290	472	-	382	624
23	-	9652	10495	14213	59	-	2982	-	-	110	1902	1323	1391	2279	300	443	-	357	584
24	11035	8479	10825	19083	60	4575	2862	4050	4793	115	1745	1248	1280	2090	310	-	-	342	-
25	10214	8524	10020	11982	61	-	2683	-	-	120	1606	1176	1175	1694	320	-	-	316	-
26	12483	8642	9301	12494	62	4323	2884	3738	5490	125	1483	1092	1088	1778	330	-	-	299	-
27	-	11357	8721	14320	63	4220	2773	3691	5071	130	1374	993	1017	1647	340	-	-	343	-
28	10648	10259	8609	15229	64	-	2780	-	-	135	1270	934	952	1530	350	-	-	322	-
29	9973	9765	8060	18016	65	3967	2577	3430	4806	140	1186	870	888	1519	360	-	-	305	-
30	9534	9149	7562	12189	66	-	2526	-	-	145	821	835	1331	12189	370	-	-	291	-
31	-	8495	-	-	67	-	2275	3239	4463	150	1022	755	788	1470	380	-	-	276	-
32	8437	7778	8686	14215	68	3602	2486	3201	3945	155	961	891	733	1379	390	-	-	262	-
33	-	-	8205	9511	69	-	2438	-	9511	160	1060	831	690	1296	400	-	-	251	-
34	7398	7982	7763	10847	70	3402	2315	2982	4411	165	1000	795	753	1201					

## Maximum Allowable RPM for Spirolox Retaining Rings – Imperial

Part No.	XVS	XWS	XWST	XWSM	XFSE	Part No.	XVS	XWS	XWST	XWSM	XFSE	Part No.	XVS	XWS	XWST	XWSM	XFSE
25	45227	-	-	36651	-	146	-	5020	-	-	-	334	-	1840	1810	1960	-
31	39946	-	-	31364	-	150	5900	4940	4670	6540	12178	337	2630	1790	-	-	3433
37	31161	-	-	23025	-	156	7720	5343	5160	6110	9004	343	3500	1750	1690	1880	3334
43	24067	-	-	18019	-	157	-	5240	-	-	-	350	2440	1700	2020	2090	3236
46	-	-	28820	21450	-	162	7220	4880	4690	5750	9118	354	-	1730	1960	2080	-
50	28030	24650	20780	20600	32573	168	6590	4930	4110	5260	8595	356	2370	1680	-	1970	3528
56	-	-	-	-	32410	175	6200	4510	3930	4970	8101	362	2270	1660	1860	1890	2970
53	-	21280	-	-	-	177	-	4410	3960	4990	-	368	2210	1600	1860	1890	2890
55	-	19440	18130	18260	-	181	5700	4290	4170	4720	8470	374	-	1520	-	-	-
56	21060	18520	17270	17400	-	187	5380	4240	3850	4540	6440	375	2120	1530	1790	1860	2964
59	-	17290	15200	15390	-	193	5100	4020	-	-	8047	381	2060	1470	-	-	2701
62	17850	19500	15700	14730	22107	196	-	3860	3320	4730	-	387	2010	1500	1620	1750	2934
65	-	16270	-	-	-	200	4720	3740	3410	4560	7650	393	1930	1510	1560	1690	2529
66	-	16510	15600	13860	-	206	5970	3550	3340	3810	7103	400	1880	1470	1560	1660	2264
68	15340	15470	15600	13510	19520	212	5550	3400	3120	3560	6603	406	-	1400	-	-	-
71	-	13050	-	-	-	215	-	3490	3120	3450	-	412	2090	1350	-	-	2367
75	12350	14290	12750	12190	22451	216	-	3370	-	-	-	413	-	1380	-	-	-
78	-	12960	11590	11110	-	218	5290	3290	-	-	6316	418	-	1360	-	-	-
81	15380	12470	11300	10150	17414	225	5050	3220	2820	3240	6040	425	1960	1360	1350	1440	2350
84	-	10770	-	-	-	231	4720	3020	2730	3040	5786	431	-	1300	-	-	-
87	12800	10570	10660	10340	17374	236	-	2870	-	-	-	433	-	1300	-	-	-
90	-	9180	-	-	-	237	4520	2890	2560	3380	6343	437	1850	1290	1250	1360	2215
93	11500	9400	9100	8760	12757	243	4240	2920	2480	3180	5089	443	-	1230	-	-	-
96	-	8920	-	-	-	250	4063	2750	3040	3090	4994	450	1750	1270	1210	1300	2116
98	-	9530	6980	8640	-	255	-	2600	3430	2920	-	456	-	1280	-	-	-
100	9800	9160	7800	8940	18675	256	3900	2600	-	-	5118	462	1670	1240	-	-	2001
102	-	9070	7400	8500	-	262	3680	2500	2780	2750	4073	468	-	1220	-	-	-
103	-	8080	-	-	-	268	3540	2470	2630	2680	4797	472	-	1180	-	-	-
106	11490	8610	8660	11260	11446	275	3400	2340	2560	2790	3981	475	1580	1180	1160	1180	2193
109	-	7350	-	-	-	281	3220	2380	-	-	4074	481	-	1140	-	-	-
112	9990	7470	7960	9820	12107	287	3100	2260	2260	2590	3927	487	1520	1120	-	-	1816
115	-	6700	-	-	-	293	2940	2140	2200	2460	3727	493	-	1090	-	-	-
118	9220	7350	6320	9040	15056	295	-	2160	-	-	-	500	1440	1050	1020	1080	1724
121	-	6340	-	-	-	300	2840	2080	2150	2410	3537	511	-	1000	-	-	-
125	8500	6750	6500	8042	11970	306	3670	2020	2090	2290	3245	512	-	1020	-	-	-
128	-	5860	-	-	-	312	3030	1980	1990	2240	3853	525	1310	970	1280	1210	-
131	7880	6310	5800	8280	13786	314	-	1980	-	-	-	537	-	900	-	-	-
134	-	5960	-	-	-	315	-	-	1990	2190	-	550	1190	890	1170	1120	-
137	7030	6110	6000	7430	11008	318	2930	1930	-	-	3731	551	-	870	-	-	-
140	-	5580	-	-	-	325	2790	1870	1900	2100	3557	562	-	840	-	-	-
143	6560	5490	5160	6700	11594	331	2700	1840	-	-	3595	575	1090	820	1100	1030	-